EXECUTIVE SUMMARY

NUCLEAR, BIOLOGICAL, AND CHEMICAL DEFENSE

ANNUAL REPORT TO CONGRESS

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EXECUTIVE SUMMARY

The National Defense Authorization Act for Fiscal Year 1994, Public Law No. 103-160, Section 1703 (50 USC 1522), mandates the consolidation of all Department of Defense chemical and biological (CB) defense programs. As part of this consolidation, the Secretary of Defense is directed to submit an assessment and a description of plans to improve readiness to survive, fight and win in a nuclear, biological and chemical (NBC) contaminated environment. This report contains modernization plan summaries that highlight the Department's approach to improve current NBC defense equipment and resolve current shortcomings in the program.

50 USC 1522 has been a critical tool for ensuring the elimination of redundant programs, focusing funds on program priorities, and enhancing readiness. While many problems remain in consolidating the NBC defense program, significant and measurable progress has been made in fulfilling the letter and the intent of Congress.[*]

There has been a consolidation of the research, development and acquisition organizations for NBC defense, including the consolidation of all research, development, test and evaluation, and procurement funds for NBC defense. There has been significant progress in the development of Joint training, doctrine development, and requirements generation. Modernization and technology plans have been developed that will begin to show real savings and true consolidation of efforts among the Services. The fruits of these plans will be realized over the next few years as the public law has time to take effect and will result in the increased readiness of U.S. forces.

The objective of the Department of Defense (DoD) NBC defense program is to enable our forces to survive, fight, and win in NBC warfare environments. Numerous rapidly changing factors continually influence the program and its management. These factors include declining DoD resources, planning for warfighting support to numerous regional threat contingencies, the evolving geopolitical environment resulting from the breakup of the Soviet Union, the forthcoming entry into force of the Chemical Weapons Convention, and continuing proliferation of NBC weapons. To minimize the impact of use of NBC weapons on our forces, we will need the capability not only to deter their use, but also to prevent it. This will require improved NBC defensive capabilities. The DoD NBC defense program continues to work towards increasing the defensive capabilities of Joint Forces to survive and continue the mission during conflicts which involve the use of NBC weapons. NBC defense programs are managed jointly under the oversight of a single office within DoD. However, the unique physical, toxicological, destructive and other properties of each threat requires operational and technological responses tailored to the threat.

For our forces to survive, fight and win in an NBC contaminated environment, an integrated and balanced program is essential. Our forces must have aggressive, realistic training,

[*] 50 USC 1522 was amended by the FY97 National Defense Authorization Act (Public Law 104-201, Section 228). In accordance with this change, chemical and biological defense programs conducted by the Defense Advanced Research Projects Agency (DARPA) will exist under separate program elements beginning in FY98 and will not be addressed under the CB defense program management and oversight structure described in Chapter 1 of this report. An overview of DARPA's programs is provided in Chapter 2.

and defensive equipment that allows them to avoid contamination, if possible, and to protect, decontaminate, and sustain operations throughout the non-linear battlespace. We must also have the capability to provide medical casualty management. Programs are in place to equip and train our forces to accomplish their missions in an NBC environment. The goal of the program is to equip U.S. forces with the finest available equipment for conducting its missions in the face of NBC threats from potential adversaries around the world.

NBC WARFARE THREAT

The Former Soviet Union's large chemical weapons stockpile and its biological weapons program formed the basis for U.S. defense planning for many years. However, with changes within Eastern Europe, the Middle East and Southwest Asia, the number of countries that have an NBC weapons capability has increased significantly and may continue to increase and pose serious threats to United States interests. The NBC warfare threat has increased in diversity and frequency. Several Third World nations now possess the technologies and capabilities to produce and deliver nuclear (including radiological) and a wide range of chemical and biological agents. The potential for facing NBC conditions in all regions, including those with temperature extremes, has dramatically increased. In meeting this changing and evolving threat, a strong NBC defense program is an essential part of DoD strategy for countering the proliferation of weapons of mass destruction.

NBC WARFARE INTELLIGENCE REQUIREMENTS

Proliferation of weapons technology, precision navigation technology, nuclear (medical, power, and industrial applications) and chemical and biological technology to developing nations presents the United States with a complicated national security challenge. Intelligence efforts must emphasize collection and analysis of nations' "dual-use" nuclear, chemical and biological industrial capabilities and develop the indications and warning of adversarial use of dual-use capabilities. Tailored intelligence documents are essential for developing and updating requirements for NBC defense programs.

NBC DEFENSE PROGRAM MANAGEMENT

Improved Management Structure

In response to Congressional direction, the Department of Defense has implemented an improved management structure for the DoD NBC defense program. In February 1994, the Secretary of Defense designated the Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs, ATSD(NCB), as the focal point for NBC defense within the Office of the Secretary of Defense (OSD). In addition, the Secretary appointed the Army as the Executive Agent for DoD to coordinate and integrate research, development, test,

evaluation, acquisition, and military construction requirements of the military departments for the NBC defense program.

Specific plans to coordinate and integrate the Services' NBC defense efforts are stated in the Joint Service Agreement (JSA) for Joint Nuclear, Biological and Chemical Defense Management. DoD implemented the JSA on August 2, 1994. Detailed procedures of coordination and integration of NBC defense efforts are contained in the DoD Chemical and Biological Defense Program Management Plan signed September 16, 1996.

The Deputy Assistant to the Secretary of Defense for Chemical and Biological Matters, DATSD(CBM), is a deputy to ATSD(NCB) and is responsible for the overall coordination and integration of all CB defense research, development, and acquisition (RDA) efforts. DATSD(CBM) provides the overall guidance for planning, programming, budgeting, and executing the CB defense program. He also retains approval authority for all planning, programming, and budgeting documents. He is responsible for ensuring coordination between the medical programs and the non-medical CB defense efforts.

The Secretary of the Army is the Executive Agent responsible for ensuring coordination, integration, and administrative support for the Services' NBC defense requirements and programs. For non-medical CBD, the Secretary of the Army accomplishes these functions through the Joint NBC Defense Board, as defined in the JSA for Joint NBC Defense, and through the Assistant Secretary of the Army, Research, Development and Acquisition, ASA(RDA). To accomplish the required planning and programming functions, two subordinate joint groups support the Joint NBC Board. The Joint Service Integration Group (JSIG) is responsible for Joint NBC defense requirements, priorities, training, and doctrine. The Joint Service Materiel Group (JSMG) is responsible for coordinating and integrating all NBC defense research, development and acquisition efforts. These two groups perform the planning and programming functions for NBC defense.

For medical NBC defense research programs, the Secretary of the Army provides input through participation in the oversight activities of the ASBREM Committee. The ASBREM Committee in concert with the ASA(RDA) is responsible for ensuring coordination and integration of Services medical CBD programs.

NBC DEFENSE PROGRAM MANAGEMENT ASSESSMENT

➢ **Oversight and management of the DoD NBC defense program continue to improve. It is imperative that the management system produces joint NBC defense requirements and NBC defense equipment that can be used by all forces. Public Law 103-160 (50 USC 1522) has provided a key tool for ensuring a jointly focused NBC defense program. The continued support of Congress and implementation of current plans will continue to improve jointness and readiness.**

Accomplishments

DoD has completed implementation of 50 USC 1522:

– An organizational structure ensuring close and continuous coordination of CB warfare defense and CB medical defense programs.

– The DoD CB Defense Program is fully integrated and coordinated and is based on validated Service requirements generated in response to defined threats.

– Responsibility for the CB Defense Program is vested in a single office in OSD and oversight is conducted using the Defense Acquisition Board (DAB) process.

– DoD has responded to all recommendations provided in the General Accounting Office (GAO) report NSIAD-96-103. DoD-planned actions in response to the GAO report were provided to the GAO in a letter from the ATSD(NCB), dated 11 October 1996, Subject: Follow-up on GAO Report NSIAD-96-103 (OSD Case 1099), "Chemical and Biological Defense: Emphasis Remains Insufficient to Resolve Continuing Problems" March 29, 1996.

– A key DoD action in response to the GAO report was the development of an immunization program for biological warfare defense. As executive agent, the Army developed alternative vaccine immunization plans. The alternative plans were coordinated with the Joint Staff and the Services for a decision by the Deputy Secretary of Defense. The Defense Resources Board reviewed the immunization plan in December 1996.

Continuing Process Improvements

Improvements to the Joint Requirements Document process need to be made in order to shorten the processing time and establish joint standards for other than Major Defense Acquisition Programs. The JSIG has requested that the JCS J-8 include process improvements in the next update to CJCS Memorandum of Policy (MOP 77), Requirements Generation System.

Standardization of a DoD wide equipment funding and acquisition policy is another process improvement being investigated to improve efficiency and economy.

NBC DEFENSE REQUIREMENTS

Continued proliferation of NBC weapons requires that DoD maintain and strengthen our defensive capabilities against such weapons. We continue efforts to prevent the use of mass destruction weapons and make preparations to operate effectively in environments marked by biological, chemical, or radioactive contamination. The three principles of NBC defense—contamination avoidance, protection, and decontamination—provide the framework for formulating program requirements. When doctrinal, training, or organizational solutions (non-

materiel solutions) cannot satisfy warfighting needs, we seek new equipment through the acquisition cycle, leveraging new technology developments to provide the best solutions.

The key to successful implementation of research, development, and acquisition (RDA) strategy is the concept of continuous incremental investment. Our RDA goal is to equip our forces with world class equipment in sufficient quantities, in the shortest possible time, to win decisively, quickly, and with minimum casualties. As authorized under the new Joint Service Agreement for non-medical programs and the ASBREM Committee for medical programs, the Army, as executive agent, coordinates, integrates, and reviews the DoD NBC defense program. The results of these reviews, conducted with all Services participating, are documented in the Joint Service Modernization and Joint Service RDA Plans. These documents form the basis for the consolidated NBC defense Program Objective Memorandum.

Non-Medical NBC Defense Mission Area Requirements and RDA Summary

Chapter 2 provides requirements and RDA program summaries for each of the principles of NBC defense. Contamination avoidance consists of three essential elements: early warning, point detection, and warning and reporting. Early warning enables U.S. forces to avoid NBC contamination or to assume the optimal protective posture. Detector development is the cornerstone for this area. The program is pursuing technological advances in remote detection, miniaturization, increased sensitivity, decreased false alarm rates, and improved logistics supportability. Biological detection capability has the highest priority.

When contamination cannot be avoided and units are forced to occupy or traverse contaminated areas, protection provides survivability and continued operational capability in the NBC environment. Individual protection equipment includes protective masks and clothing. Technological advances are being pursued to produce mask systems fully compatible with vision and weapons' sighting systems. Individual protective ensembles are being developed to improve protection, decrease heat and weight stress, and to ensure integration with laser, ballistic and other forms of individual protection. Collective protection equipment includes shelters for command posts, rest and relief, vehicular collective protection, and safe zones aboard ship. Technological improvements will reduce weight and size and increase filter lifetime to improve deployability. Technological improvements that reduce logistical and manpower requirements, *e.g.*, filter change frequency and shelter assembly and disassembly time, are also being pursued.

When contamination cannot be avoided, forces must decontaminate personnel and equipment to reduce or eliminate contamination hazards. While effective against a wide variety of threat agents, existing decontaminant systems are corrosive, labor intensive, and pose logistical, environmental, and safety burdens. To improve decontamination capabilities, the program places emphasis upon new decontamination technologies which reduce existing manpower and logistics requirements, are less corrosive, and which may be used to decontaminate sensitive equipment such as avionics or electronics.

NON-MEDICAL R&D REQUIREMENTS ASSESSMENT

➢ **Advanced technologies and new methods are currently being examined for fixed facility decontamination. Follow-up investigations are planned over the next year to determine the requirements necessary to perform decontamination of large areas, including cleaning areas to sustain cargo handling operations. Over the past year, the Services have worked together to improve the Joint orientation of NBC defense requirements. The work being accomplished will improve the equipment fielded in the near future. More emphasis needs to be placed on the Warfighting Commanders-in-Chiefs' (CINCs) requirements as input for equipment research and development. This is necessary to ensure that future equipment meets the needs of the Joint battlespace environment.**

Areas of concern that are addressed under the management improvement initiatives include the following:

- Focusing and prioritizing chemical and biological detector programs to ensure that resources are leveraging the most promising technologies and are not diluted by excessive Service unique requirements.

- Developing advanced individual protection ensembles that minimally degrade an individual's performance for all tasks performed in contaminated environments.

- Determining adequacy of funding for advanced decontamination systems, reviewing requirements for large scale decontamination systems, and allocating sufficient funds to define requirements for large area decontamination.

- Identifying requirements for collective protection programs to ensure that enough assets are available to complete missions in a CB environment.

Medical NBC Defense Requirements

The medical NBC defense research program has three broad goals:

- protect U.S. forces war fighting capabilities during an NBC attack;
- treat casualties to prevent lethality and maximize return to duty; and,
- maintain state-of-the-art research and development efforts to provide timely medical countermeasures.

To meet these three goals, the Army executes three programs. The Medical Chemical Defense Research Program (MCRDP) provides new pretreatments, antidotes, and topical skin protectants for chemical warfare agents, and develops novel therapies for chemical agent casualties. The Medical Biological Defense Research Program (MBDRP) provides medical countermeasures to deter, constrain, and defeat the use of biological threat agents, as well as advanced diagnostic defenses. The Medical Radiological Defense Research Program (MRDRP)

provides effective countermeasures to both short and long-term effects of ionizing radiation and contamination, including advanced methods of determining radiation exposure levels. Finally, improved casualty care practices doctrine will increase the return to duty rate for troops exposed to chemical and biological agents, thus adding to force sustainment.

To effectively protect individuals against biological warfare (BW) agents, the United States must immunize combat forces. Our priorities are to develop new or improved vaccines against validated BW threat agents and increase the vaccine stockpile. Improved nerve agent antidotes and topical skin protectant increase force survivability against chemical threats. Fielding of a radiation antiemetic will allow service members to continue mission operations despite exposure to moderate levels of radiation in nuclear warfare environments.

MEDICAL R&D REQUIREMENTS ASSESSMENT

- **DoD lacks FDA-licensed vaccines against BW threat agents.**

  SOLUTION: The DoD will award a prime systems contract during FY97 for the acquisition of vaccines, to include advanced development, FDA licensure, production, storage and testing. In addition, DoD will complete an assessment of vaccine requirements and update vaccination policy for U.S. forces in order to define the cost and scope of the program.

- **The effects on humans resulting from the exposure to low doses of chemical agents, particularly organophosphate (nerve) agents, are not clearly understood.**

  SOLUTION: Beginning in FY96, DoD, in association with the Research Working Group of the Interagency Persian Gulf Veterans' Coordinating Board, dedicated $5 million to evaluate the chronic effects of low-dose level exposure to chemical agents. Additional funds have been committed for similar and follow-on research in FY97. Studies will address both vesicants as well as nerve agents. Funds will be used to evaluate effects of chemical agents potentially related to chronic health complaints, and for epidemiological projects aimed at identifying health consequences in military personnel potentially exposed to chemical agents.

- **The effects on humans of low-level radiation, contamination fields, radiogenic munitions*, i.e.*, depleted uranium, and their interactions with chemical and biological weapons have not been evaluated. All preliminary data indicates a high probability that interactions will result in markedly increased numbers of casualties.**

  SOLUTION: Definitive assessment of NBC threat interactions and NBC agent modeling will support the strategic design and development of specific preventative and treatment countermeasures.

NBC LOGISTICAL READINESS

Since OPERATION DESERT SHIELD/STORM, the logistical readiness of NBC defense equipment has improved. Services have increased stockage of most NBC defense equipment items especially individual protection items. However, shortfalls in the accountability and management of chemical and biological defense items continue and affect readiness and sustainment. In addition, industrial base strategy for NBC defense items remains unstable. Through joint efforts, the Services are actively pursuing solutions to these shortfalls.

Although Congress moved to make NBC defense more "joint" through the passage of Public Law 103-160 in 1993, only research, development and procurement programs have benefited through the creation of a joint DoD funding lines. While fielded NBC defense equipment is expected to be joint, the transition of moving from service-unique logistics management to joint logistics management has only just begun. As a result of sustainment management and funding remaining the responsibility of the individual Services, the overall logistics status of the DoD NBC defense program is not as joint as the research and development process.

NBC defense is not a high priority in peacetime, and spending to maintain the inventory to meet the two major regional contingency (MRC) scenario requirements has been dropping for years. Serious readiness and sustainment issues exist, many of which were highlighted in the March 1996 GAO report. Units throughout DoD are short end-items, consumables, and parts needed for initial deployment as a result of other priorities of procurement and operations and maintenance (O&M) funding. War reserve inventories are at a level that industrial surge-production cannot make up the shortages of many NBC defense end items and consumables within the Defense Planning Guidance timeframe. These facts govern the DoD NBC defense program environment. If the Services face another MRC with an imminent NBC threat, such as DESERT STORM, the demand for NBC defense equipment will be urgent.

While problems remain, joint aspects of the DoD NBC defense program continue to grow. The successful completion of the FY98-03 POM Strategy demonstrated the Services' commitment to coordinating their requirements and funding. The Joint Service Lightweight Integrated Suit Technology (JSLIST) has incorporated joint logistics and procurement to deliver standardized protective ensembles for all Services. The XM22 Automatic Chemical Agent Detector/Alarm (ACADA), jointly developed by the Air Force and Army, shows good promise to become one of the first truly joint (cradle to grave) NBC defense items. Tri-Service medical NBC programs are very closely coordinated in the logistics area, representing a goal toward which non-medical NBC programs aspire.

NBC Defense Equipment Availability

The logistics community has recognized several shortfalls in the accountability and management of NBC defense item inventories. *First*, the Services continue to have very limited

asset visibility of most chemical and biological items below the wholesale level. *Second,* Services procure consumable NBC items through multiple, separate and distinct funding authorizations.

Industrial Base

Since OPERATION DESERT SHIELD/STORM, DoD has completed several industrial base assessments. These studies confirm that the NBC defense industrial base sector primarily consists of small to medium size companies. These companies depend heavily on military requirements and sales for their survival. Recent changes in the NBC threat, as well as reductions in overall DoD NBC defense requirements have had a severe impact on this sector making it extremely fragile. DoD's "War Stopper" program currently aids in sustaining this base for some selected systems—battle dress overgarment, chemical gloves, and nerve agent auto-injectors. The Services must continue to integrate the vulnerability of the industrial base into acquisition and procurement decisions in order to maintain a responsive industrial base.

LOGISTICS SUPPORT ASSESSMENT

➢ **DoD lacks a joint, integrated system to maintain asset visibility of NBC defense equipment below wholesale level, and lacks a standardized war reserve program for NBC defense equipment. Resourcing the procurement and sustainment of wartime stocks of individual protective equipment, decontamination kits, and detector kits remains the responsibility of the Services.**

***SOLUTION*:** DoD established the requirement for asset visibility and reviewed existing systems and procedures, both for peacetime reporting and war time reporting. The Services and the Defense Logistics Agency are addressing the NBC defense asset visibility deficiency under the auspices of the Total Asset Visibility initiative.

During 1997 all four Services are participating in development of the JCHEMRATES[*] IV study which will provide a more accurate prediction of the initial issue and sustainment quantities required for each Service than previous studies. Results of this effort should be available for inclusion in next year's Annual Report to Congress. The use of this common methodology will allow the presentation of Joint Service requirements in future reports and facilitate improved joint logistics management.

In November 1996, the JSMG completed a *Joint Service Nuclear, Biological and Chemical Defense Logistics Support Plan*. The plan outlines proposed short-, mid-, and long-term strategies to resolve and overcome many of the problems facing NBC defense equipment readiness and sustainment. The vision for the long-term is to develop a partnership of medical and non-medical NBC defense items in all Services with industry to improve the coordination and management of development, production, and stockpiling/sustaining of NBC defense equipment. The Department continues to pursue innovative strategies to maintain a responsive industrial base, especially those strategies

[*] Joint Chemical Defense Equipment Consumption Rates

that decrease industry reliance on DoD procurement for industrial base survival. Strategies may include tapping into to independent research and development (IR&D) conducted by universities and corporations, increasing reliance on dual-use technologies, and pursuing strategies that will encourage companies to decrease dependency on DoD requirements for their survival.

NBC DEFENSE TRAINING AND READINESS

NBC defense training and readiness continues to be a critical element of deterrence. The Services continued to improve the exercising of their NBC defense responsibilities under Title X of the FY94 National Defense Authorization Act. The vision for the future is to build on the Service successes to develop a viable joint orientation to NBC defense capabilities. This capability must include joint doctrine and tactics, techniques, and procedures; joint modeling, simulation and wargaming; and joint professional training.

Joint Doctrine for Nuclear, Biological, and Chemical (NBC) Defense (Joint Pub 3-11) is the cornerstone Joint doctrinal manual. This document provides an overview of NBC defense operations at the strategic level. To fully implement this doctrine, the Services must develop solid operational joint NBC defense doctrine and tactics, techniques, and procedures that integrate Service operations in the battlespace.

Each of the Services has established adequate training standards and programs to sustain unit NBC training and readiness. They conduct NBC defense training at schools and in units. In compliance with Public Law 103-160, Section 1703, the Services NBC defense professional training schools are co-located at the U.S. Army Chemical School, Ft McClellan, Alabama. Currently, Services conduct their own training with their own instructors, but all use the Chemical Defense Training Facility at the Army's Fort McClellan, Alabama, to train NBC defense experts and leaders in a lethal agent environment.

NBC DEFENSE TRAINING AND READINESS ASSESSMENT

➢ **DoD lacks a mechanism to provide adequate information on the current status of training, equipment, and readiness. It needs adequate information to assess operational force capabilities from the Department and the warfighting CINCs' perspectives.**

***SOLUTION*:** Assign consistent and higher priority to NBC defense, especially by the Joint Chiefs of Staff and the warfighting CINCs, in order to maintain an adequate state of readiness and to ensure NBC defense reporting information is accomplished in a timely and adequate manner. Existing reporting systems may provide an adequate mechanism for assessing readiness.

➢ **Joint NBC defense doctrine needs to be continually developed and include joint tactics, techniques, and procedures.**

***SOLUTION*:** Initiatives began in 1987 to develop joint NBC defense doctrine which resulted in Joint Pub 3-11, *Joint Doctrine for Nuclear, Biological, and Chemical (NBC) Defense*. In FY95 efforts were initiated to update this document. The Joint Service Integration Group is responsible for assisting the Services in the development of this doctrine under sponsorship of the Joint Staff. Continued Service interaction and cooperation facilitated by these organizations will produce the next generation of Joint NBC Defense Doctrine.

➢ **There are limited chemical and biological features in wargaming and planning models.**

SOLUTION: Funding to add chemical and biological warfare to exercise scenarios has been received for FY96. Efforts are underway in the current DoD programming cycle to establish long term support. The CB Modeling Process Action Team is also addressing this issue.

CHEMICAL WEAPONS CONVENTION ISSUES

DoD has set up a functional Implementation Working Group (IWG) to plan for the implementation of the Chemical Weapons Convention (CWC) and related chemical weapons agreements. Through regularly recurring meetings, representatives of OSD, the Joint Staff, the Military Services, and DoD agencies and activities plan and coordinate to ensure successful implementation of the CWC and related bilateral CW agreements.

OSD, the Joint Staff, the Military Services, On-Site Inspection Agency (OSIA) and the Defense Special Weapons Agency (DSWA) provide technical experts to support activity at the CWC Preparatory Commission (PrepCom) in The Hague, The Netherlands on a recurring basis. The PrepCom is charged with developing procedures and establishing the international forum, the Organization for the Prohibition of Chemical Weapons (OPCW), which will oversee international compliance with the CWC. These activities focus on all requirements of the CWC, including those outlined in Article X of the CWC, "Assistance and Protection Against Chemical Weapons."

The Military Services and the OSIA have developed individual, detailed implementation plans to provide guidance for their commands and activities under the CWC and the related agreements. As outlined in their individual plans, the Services and OSIA have conducted assistance visits and formal exercises to ensure that all elements are prepared to comply with the agreements.

In accordance with the DoD Master Program Plan for Research, Development, Test and Evaluation for Arms Control, DSWA directs the DoD research and development effort to ensure the arms control verification proceeds using the most effective technology available.

CONCLUSION

The DoD NBC defense program has made significant progress in improving the coordination and integration of Service NBC defense research, development, and acquisition (RDA). The community is now better prepared to address shortcomings which still exist in our NBC defensive posture. The established RDA program will resolve many shortcomings by executing current procurement plans and adapting available technologies. Funding constraints will delay modernization and could effect training realism. For programs which demand state-of-the-art solutions, the Department must demonstrate a continued commitment of time and resources. Together with improved joint management initiatives, proactive programs, and stable and balanced funding, U.S. capabilities and readiness will continue to improve into the future.